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The jet transport coefficient uncertainties from parton fragmentation functions in heavy ion collisions

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Jet quenching is an important probe to quark-gluon plasma created in high-energy heavy-ion collisions. A significant parameter is known as jet transport coefficient $\hat{q}$ for jet eneygy loss, characterizing the interaction between the parton jet and medium. We study nuclear modification factors of hadron at large p_T in central $A + A$ collisions in a NLO pQCD parton model in which parton fragmentation functions (FFs) are modified due to jet energy loss. We employ 6 sets of current FFs to extract $\hat{q}$ via a global fit to data for both single hadron and dihadron suppressions, and obtain the jet transport coefficient uncertainties. The numerical results show that the significant uncertainties for $\hat{q}/T^3$ extraction are mainly brought by the different contributions of gluon-to-hadron in the different sets of fragmentation function parameterizations due to gluon energy loss being $9/4$ times of quark energy loss.

Theory / experiment

Theory

Group or collaboration name

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